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CTIA

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December 3, 1993

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W. Room 222
Washington, D.C. 20554

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DEC - 3 1993

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Building The
Wireless Future

Re: Ex Parte Filing
GEN Docket No. 93-252 (Regulatory Parity)

Dear Mr. Caton:

On Friday, December 3, 1993, at the request of the Tariff Division, the Cellular Telecommunications Industry Association ("CTIA") provided copies of four documents referenced in its pleadings filed in the above-captioned proceeding.

The documents included the study, prepared by Dr. Thomas W. Hazlett, entitled *Market Power in the Cellular Telephone Duopoly*, and filed by Time Warner Telecommunications in GEN Docket No. 90-314 on August 27, 1993; the paper, prepared by Drs. Charles Jackson and John Haring, entitled *Errors in Hazlett's Analysis of Cellular Rents*, filed on Behalf of Bell Atlantic Personal Communications in GEN Docket No. 90-314 on September 14, 1993; the paper, prepared by Stanley M. Besen, Robert J. Larner, and Jane Murdoch, entitled *The Cellular Service Industry: Performance and Competition*, and filed by CTIA as an attachment to its Reply Comments in GEN Docket No. 90-314 on January 8, 1993; and CTIA's *Semi-Annual Report on State Regulation*, dated July 1993.

Copies of the referenced documents are attached.

If there are any questions in this regard, please contact the undersigned.

Sincerely,


Robert F. Roche

Enclosure

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T I M E W A R N E R
T E L E C O M M U N I C A T I O N S

Contact:
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For Immediate Release

**TIME WARNER TELECOM FILES REPORT CONCLUDING THAT
CELLULAR SERVICE WILL COST CONSUMERS \$5,900 MORE THAN IT
SHOULD OVER TIME**

Washington, DC, August 27, 1993 -- Time Warner Telecommunications today filed a report with the Federal Communications Commission examining the extent of monopoly power cellular telephone companies exert currently. The report concludes that, without meaningful new PCS competition, cellular's market power will cost the average cellular subscriber more than \$5,900 over time.

The study, prepared by Dr. Thomas W. Hazlett, is entitled Market Power in the Cellular Telephone Duopoly. Dr. Hazlett is a professor of economics and public policy at the University of California, Davis. In 1991-1992 he served as Chief Economist of the Federal Communications Commission.

After careful and rigorous analysis, Dr. Hazlett reached the inescapable conclusion: the cellular telephone industry is an FCC-created duopoly extracting exorbitant rents that are, in Dr. Hazlett's words, "off the charts."

In commenting on the significance of the report, Dennis R. Patrick, President and CEO of Time Warner Telecommunications said, "In establishing a new Personal Communications Service (PCS), the Commission holds a golden opportunity to break the stranglehold the cellular industry has over the mobile phone user and make wireless services more affordable and accessible to the average American. "

Patrick added, "Dr. Hazlett has shown us that the current market and regulatory structure is costing each mobile service subscriber thousands of dollars. This restricts service to the moneyed few. The Commission should not squander the opportunity to turn wireless communication into a truly competitive, mass market service by giving new entrants a fair opportunity to go head-to-head with the cellular industry."

Patrick went on to explain that a "fair opportunity" for new entrants will require access to adequate bandwidth and exclusion of the incumbent duopolists from participation in the new spectrum allocation. He described as "inconceivable" the possibility that the FCC would forgo consumer benefits and new growth in the industry by awarding new spectrum to the already "spectrum-rich" incumbents.

Time Warner is the world's leading media and entertainment company, with interests in magazine and book publishing, recorded music and music publishing, filmed entertainment, cable television and cable television programming. Time Warner recently announced its intention to upgrade its cable systems into "Full Service Networks" providing various state of the art multimedia and telecommunications services. "Next generation" mobile telephone services ("PCS") are among the services Time Warner intends to offer.

####

MARKET POWER IN THE CELLULAR TELEPHONE DUOPOLY

**A Report Prepared for Time Warner Telecommunications
by Thomas W. Hazlett, Ph.D.***

August 1993

***Associate Professor, University of California, Davis, and Director, Program on Telecommunications Policy, Institute of Governmental Affairs, University of California, Davis. This paper reflects solely the views of the author.**

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1 Executive Summary

The evidence that current cellular telephone operators possess a high degree of market power, which is used to raise prices significantly above costs, is simply overwhelming. Rates in typical cellular markets are at least twice those needed to cover costs (both operating and capital). This fact is responsible for the extremely high Q ratios in the industry: typically, market values for cellular systems are 6-12 times the replacement cost of tangible capital. In a competitive industry, and for U.S. corporations as a whole, this ratio will generally be about 1-1.

The high prices and profitability of cellular telephone systems cannot be explained by successful entrepreneurship in the competition for customers. The extraordinary Q ratios are seen industry-wide, and are commonly known to reflect the value not of the operating systems, *per se*, but of the FCC licenses necessary to operate. These licenses are so valuable primarily due to the entry barriers which limit cellular markets to a duopoly: only two firms are allowed to offer cellular service under current FCC policies. The U.S. Department of Commerce has estimated that cellular telephone licenses in metropolitan service areas are worth, nationwide, about \$87 billion, while physical capital invested is only about \$7 billion. This huge disparity springs from the legal protection from competition which allows cellular operators to raise prices far above costs.

Some of the most compelling evidence that cellular operator market power is tied to the duopoly licensing scheme comes from the cellular industry itself. Cellular firms have opposed opening up their markets to new entrants, thus revealing their underlying belief that prices would fall if legal restraints on competition were removed. Moreover, cellular firms have argued explicitly that the value of their operating systems is virtually all represented by the value of an intangible asset -- the FCC license, and the duopoly market structure which it now protects. These firms themselves claim that federal regulation, not their business acumen, allow them to set prices easily above competitive levels.

There is more than ample evidence to conclude: cellular operators today enjoy enormous profitability which is a reflection of the value of the two-to-a-market rule imposed and protected by FCC licensing policy.

2 Cellular Telephone Markets: Why Only Two?

The current market structure of cellular telephone delivery in the United States, 733 license areas with exactly two firms offering service in each, was never intended to establish a fully competitive market. Quite the reverse. In allocating spectrum for cellular telephone service in the 1968 to 1981 period, the Federal Communications Commission operated primarily on the monopoly model. This was hardly surprising, in its day. The essential decision-making leading to the limiting of the market to just two rival suppliers was a product of the old telecommunications marketplace, wherein monopoly was dominant. Pre-divestiture, AT&T accounted for 85% of local telephone carriage, and 100% of long-distance. As detailed by George Calhoun:

*In 1970 it was assumed by almost everyone that the new mobile telephone service would be operated as an extension of AT&T's wireline telephone monopoly. The initial decision of 18262 [the FCC's cellular rulemaking] specifically allocated the new mobile telephone spectrum to the wireline telephone companies only...*¹

Originally, the Federal Communications Commission had suspected that cellular telephone service was a "natural monopoly" -- direct competition would be uneconomic. In its 1968 land mobile telephone Notice of Inquiry², it stated that, "since a cellular system is technically complex, expensive, and requires a large amount of spectrum to make it economically viable, competing cellular systems would not be feasible in the same area."³ Even when competitive carriers

1 George Calhoun, *Digital Cellular Radio* (Norwood, MA: Artech House: 1988), p. 50.

2 *Land Mobile Radio Service, Notice of Inquiry*, Docket 18262, 14 FCC 2d 320 (1968).

3 Cited in Christopher W. Mines, "Regulation and the Re-Invention of Cellular-Telephone Service in the United States and Great Britain," (Harvard University, Kennedy School of Government: Program on Information Resources Policy paper (9 February, 1992)), p. 24.

commented that, if only the wireline system could financially afford to compete then it would be superfluous to keep rivals out, the FCC in 1975 still anticipated only one firm would be profitable in the cellular telephone marketplace. "The possibility of more than one applicant (or of a successful applicant other than AT&T) seems to have been considered by the FCC as an unlikely event..."⁴

Of course, the world was very different then. In terms of technology, the old pyramid-shaped telecommunications structure prevailed, but it was soon to be replaced by today's geodesic shape.⁵ With respect to regulatory structures, traditionally anticompetitive rules (and even agencies) were beginning to be eliminated by the gale of deregulation. And with respect to law, the procompetitive thrust of antitrust in telecommunications, shaking loose monopolies and replacing them with interconnected yet competitive rivals, was still around the corner. In short, the FCC decision to license just two rivals in each cellular telephone market was a product of its day -- a far less competitive time in terms of the law, economics, and technology of telecommunications markets.

As the FCC split the difference between competition and monopoly in 1981, belatedly allowing some competition in cellular but steadfastly resisting the encouragement of the Department of Justice to offer an "open entry" solution, it may have gone as far as politics would allow:

To have followed a more competitive path would have required a much stronger hand than the FCC could play in the 1970s... [I]n the absence of an internal "theory" for the implementation of competition in cellular service, the Commission was paralyzed by conflicts among the major interest groups. In the end, the decision was to straddle the options.⁶

⁴ *Ibid.*, p. 25.

⁵ See Peter W. Huber, *The Geodesic Network: 1987 Report on Competition in the Telephone Industry* (Washington, D.C.: U.S. Department of Justice, Antitrust Division: January 1987), Chapter 1.

⁶ *Digital Cellular Radio*, p. 61.

The experience over the past decade with cellular service in the field reveals now what the Commission did not know, or care to find out, in 1981: two-to-a-market is not enough. The duopoly market structure in cellular telephony has led to the exercise of enormous market power by industry incumbents. This is theoretically deducible from the simple analysis of duopoly pricing. Importantly, however, it is evidenced in real-world cellular telephone markets in striking ways: In the huge license rents paid to become a duopolist; in the large gap between price and marginal cost found in cellular operating data; in the high profitability associated with competitive entry, both real and projected; and in the sharp impact that new competition is likely to have on both customer prices and license values in the cellular telephone industry. All the evidence points in one direction alone: The current duopoly market structure raises service prices and restricts output for mobile telephone consumers, thus creating a classic inefficiency.

3 The Theory of Duopoly Pricing.

The level of prices charged when two firms compete in a market is generally estimated to fall between monopoly, on the high side, and competition, on the low. This result can be altered in some situations: collusion can push the price up to what a monopoly would charge, while the existence of a perfect substitute could reduce the price to competitive levels. It also depends on the inability of new firms to easily enter the market. When potential competition is feared, incumbents may have an incentive to "limit price," such that competitive rates are charged despite the lack of robust competition within the market.⁷

⁷ This form of competition, which may occur by contract, is called "competition for the market." See, generally, Harold Demsetz, "Why Regulate Utilities," *Journal of Law & Economics* XI (April 1968), pp. 55-65. For a more recent treatment, see, Robert Innes and Richard Sexton, "Strategic Buyers and Exclusionary Contracts," *American Economic Review* (forthcoming).

Even in the classic duopoly case, where entry barriers constrain competition to two firms which can affect market price, duopoly pricing is still not determinative. That is, the profit-maximizing pricing strategy of one duopolist will inherently depend on the behavior of the other. These reactions of firms are themselves subject to various ambiguities, such that a variety of different strategies could be employed by rational firms. In that differing strategies will alter the prices charged to consumers, economists often analyze such situations by resort to game theory.³

A standard method used by economists to analyze the duopoly pricing problem, however, is to view competition proceeding in the following manner: prices are set by either firm, in sequence, on the assumption that the other firm's output will not change as a consequence of its actions. The first firm will, for example, initially set a monopoly price on the assumption that the second firm will produce nothing. The second firm then sets a lower price on the assumption that the first firm will continue to produce a monopoly level of output. The first firm then sets a new price which is lower than monopoly, because now it assumes that the second firm will pro-

³ The most famous paradigm in game theory is the "prisoner's dilemma." It is assumed that two prisoners are questioned separately about their joint involvement in a crime. If both prisoners stonewall, they will each receive light sentences. If they both confess, they will both receive longer sentences. But if one confesses while the other stonewalls, the confessor gets off very easy while the stonewaller receives a very long sentence. The key result: What is jointly in the best interests of two agents can be difficult to achieve because the temptation of individuals to maximize their own utility at the expense of another's. With duopolists, while both firms could jointly maximize profit at a monopoly price level, each has an incentive to slightly undercut the other firm and to garner a larger market share. How far this incentive takes prices down from monopoly towards competitive level depends crucially on the strategic interactions of the two players in the game. On game theory analysis of duopoly pricing see Jean Tirole, *The Theory of Industrial Organization* (Cambridge, MA: MIT Press; 1989).

duce a positive level of output. And the process iterates price and output levels until both firms set identical levels, and therefore have no tendency to change. This is called a Cournot equilibrium.⁹

Under this set of assumptions, we may easily analyze what happens to price as additional firms enter a market featuring constant unit (and therefore marginal) costs, using a Lerner Index:

$$\frac{P - MC}{P} = \frac{1}{ne},$$

where n is the number of competitors and e is the elasticity of demand for the market as a whole.¹⁰ In Table 1, I show how price will change with the number of entrants under the assumption of constant elasticity of demand equal to unity, and constant returns to scale.¹¹

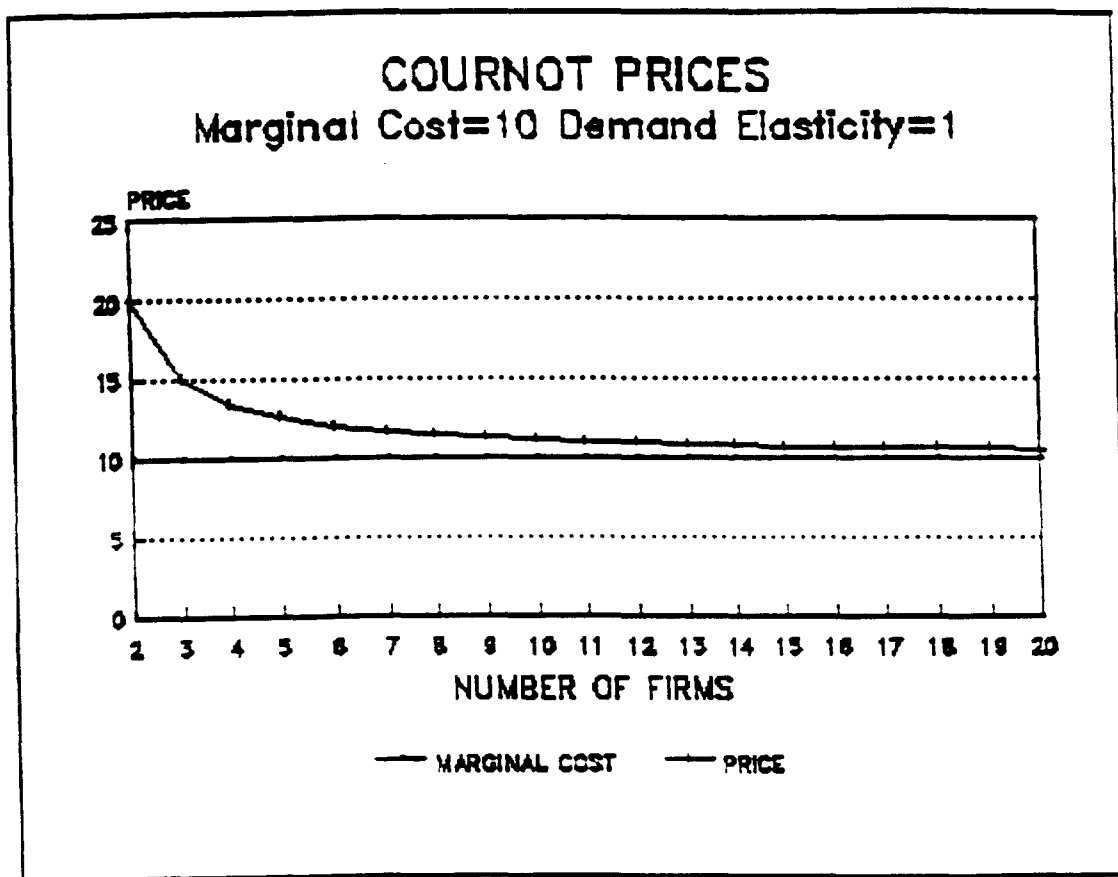
TABLE 1			
Price Changes With Competitive Entry in Cournot Equilibrium			
Number of Firms	Elasticity of Mkt. Demand	Price/MC Ratio	% Price Drop w/ Marginal Entrant
2	1	2.0	
3	1	1.5	25
4	1	1.33	11.3
5	1	1.25	6.0
6	1	1.20	4.0
7	1	1.17	2.5
100	1	1.01	0.01
∞	1	1.00	0

⁹ This model is used by policymakers to estimate the likely effect of new entry on service prices in telecommunications markets. See Evan Kwerei and John Williams, "Changing Channels: Voluntary Reallocation of UHF Television Spectrum." (Federal Communications Commission: OPP Working Paper 27; November 1992) (hereinafter, "Kwerei & Williams"), pp. 82-3.

¹⁰ See Kwerei & Williams, p. 82.

¹¹ These assumptions are commonly made when analyzing duopoly pricing. For instance, they are employed by Kwerei & Williams, *ibid*.

The results of this analysis are straightforward. Consumer prices are expected to decline with the number of entrants, barring some possibility for potential entrants to bargain with customers or to otherwise threaten entry. Since the barriers to entry in a market requiring federal licensing are a matter of black and white -- firms without licenses cannot legally enter, period -- the analysis developed here is thought by economists to be a good representation of what will happen in real markets: duopolists will reliably set prices above what would prevail in the face of additional entrants. In determining the likely price differences to result from adding a third competitor to the cellular telephone marketplace, Evan Kwerei and John Williams infer a price reduction of 25% based on this standard economic analysis.¹²



¹² Kwerei & Williams, p. 83.

This comports quite nicely with common sense. Prices tend to be higher under monopoly than under competitive conditions; moreover, prices decline very rapidly when a few new rivals are added to monopoly markets. Prices continue to decline as new firms enter the competition, but not as quickly as at first. By the time a large number of firms are in competition, prices are about as low as they are likely to go. These results can be discerned from the simple model summarized here in Table 1, and graphed above.

4 Evidence.

Where prices will actually go must, in precise terms, be ultimately answered by our marketplace experience. That is, because of the complexities involved in strategic pricing behavior and the range of theoretically possible outcomes, we must be careful to examine real world evidence when reaching any hard conclusions about market power (pricing above competitive levels), in fact. In the cellular telephone markets, this means examining price data for both cellular telephone service and for cellular telephone systems.

4.1 Cellular Telephone Service Rates.

According to operating data reported by the Congressional Budget Office¹³, the rates currently being charged by cellular telephone operators far exceed competitive levels. This is found in the excess between cash flows (revenues minus operating expenses) and capital depreciation expense. In a competitive industry, the cash flows are just large enough to pay back investors for their outlays (including a competitive rate of return on capital). Yet, the cellular industry demonstrates cash flows that exceed capital expenses by several times.

¹³ Congressional Budget Office, *Auctioning Radio Spectrum Licenses* (March 1992) [hereinafter "CBO"].

The CBO numbers, which are very conservative¹⁴, are summarized in Table 2. Essentially, the average subscriber pays about \$80 per month, of which \$20 goes for operating expenses¹⁵, putting at least \$60/per sub/month into operating profits (or "cash flows"). Capital expenditures are about \$10 per pop¹⁶; with a penetration rate of 2% of the market, this translates into a per-subscriber capital expense of \$500. (There are currently about 11 million cellular subscribers, which is slightly over 4% national penetration: an even split between two operators yields a firm penetration rate of 2%.) In addition, the CBO lists net marketing costs as \$300 per new subscriber.¹⁷ This yields a total investment per subscriber of \$800.

Assuming a 10 year useful life for this investment and requiring a healthy 10% rate of return,¹⁸ the \$800 capital cost implies a monthly capital expense of \$10.57 per month per subscriber. Subtracting this from cash flows reveals a monthly profit per subscriber per month of \$49.43 – about 62% of revenues. In other words, cash flows are nearly five times the level of capital expense: clear evidence that cellular duopolies exercise market power by charging rates in excess of competitive levels.

14 They give average monthly revenue per cellular telephone subscriber as \$80, for instance, when Kweref & Williams note that for the "typical market," the 1992 figure is \$91.

15 The CBO notes that costs are "under \$20."

16 CBO, p. 26, citing Greenberg & Lloyd. Note that this is actually "per pop *per firm*." Total industry costs per pop are, of course, twice as high.

17 The level of marketing cost may be inflated due to duopoly market structure. That is, since customers are more valuable to sign-up at higher prices, the lack of competition may encourage overinvestment in sales and advertising effort. Hence, this \$300 estimate is likely to be above the efficient level of marketing expenditures, and would fail in a more competitive marketplace.

18 This is the discount rate used by Kweref & Williams, p. 32.

TABLE 2		
Per-Sub Revenues, Costs, and Profits in Cellular Telephone Service		
	Lump Sums/Sub	Cash Flows/Sub/Mo
Revenues		\$80.00
Operating Costs		\$20.00
Fixed Costs: Mktg/Adv.	\$300	
Fixed Costs: Equipment	\$500	
Fixed Costs Amortized @ 10% w/ 10-year life	\$800	\$10.57
Profits		\$49.43
Profit/Revenue		62%
CF/Amortized Fixed Costs		5.7
Present Value of Profits Discounted @ 10%*	\$5,932	

Source: CBO, p. 26.

*See discussion in 4.2.

The story presented by the numbers is inescapable. As the CBO was forced to conclude: "The \$60 difference between the monthly operations cost of service and monthly revenue is by most accounts more than sufficient to cover fixed capital and marketing costs, and to account for very high profits."¹⁹ Certainly, this is what the FCC's own analysis took as the empirical starting point in analyzing the effect of new competition in cellular markets. In Kwerei & Williams' 1992 study, the level of profit, net of all capital expense, was also over

¹⁹ CBO, p. 26; footnote omitted.

50% of revenues. In their base case scenario of the current cellular telephone duopoly market in Los Angeles, summarized in Table 3, they estimate net market values of \$3.06 billion for each firm²⁰, or more than twelve times their cost of capital.²¹

TABLE 3		
FCC Estimates of Operating Profits in L.A. Cellular Market		
	System A	System B
Market Share	50%	50%
PV of Total Cost	2,373.4	2,373.4
PV of Total Revenue	4,686.1	4,686.1
PV of before-tax profits	2,312.7	2,312.7
PV Total Cost/PV Total Rev	50.6%	50.6%

Source: Kwerel & Williams, p. 58.

None of this is surprising to economists or industry analysts. Given that the mobile telephone market does not face perfect substitutes, and that potential entrants are blocked by license barriers, there is no expectation that incumbent duopolists will price down to the level of unit costs. The price evidence confirms the theoretical priors:

*This simple comparison of monthly average revenues with monthly average costs is consistent with the expectation of economists that, in markets with only two producers, prices will remain well above costs... The absence of aggressive price competition from the cellular telephone industry is so well established that a single instance of dramatic price reductions in Rochester, N.Y., is recognized throughout the industry as a costly mistake.*²²

20 Kwerel & Williams, p. 56.

21 Multiplying the Department of Commerce (Table 4) estimate of the replacement cost of capital for large cellular markets (\$18.57 per pop) by Kwerel & Felker's population statistic for the L.A. cellular territory (13 million). See the discussion of Q ratios below.

22 CBO, p. 27; footnote omitted.

4.2 Q Ratios.

The most compelling evidence that cellular duopolists enjoy significant ability to price above cost actually comes from another market: the capital market. Here, investors are themselves observed estimating the present values of various holdings. They thereby illuminate the presence of monopoly pricing structures, on the one hand, and competitive structures, on the other. Because investors are bidding on assets with their private resources, analytical arbitrariness is removed. The capital market is itself rendering a verdict on the market power associated with various industries.

A firm's Q ratio is defined simply as the ratio between a firm's market price, on the top side, and the replacement cost of its assets, on the bottom.²³ For an industry, the Q ratio is the mean of all the firms within that industry. Q ratios significantly above one indicate the presence of market power: assets are being valued at above their cost because prices are above competitive levels. Hence, in a competitive marketplace, the Q ratio is about one. For firms on the New York Stock Exchange, the average Q ratio (in recent years) is slightly below one.

The strength of the Q ratio analysis is that the prices involved are both determined in the marketplace: the numerator is set in asset or financial markets, while the denominator is set in input markets. Hence, this method of analyzing market power eliminates arguments over market definition, demand elasticities, cross-elasticities, and other difficult to measure variables. The Q ratio, in essence, defines the product market the way actual investors define the market, and use their expectations about demand, substitutes, costs, risks, and interest rates in deducing a forecast of capitalized monopoly profits.

²³ $Q = \{\text{Capital Value}\}/\{\text{Replacement Cost of Capital}\}.$

When using Q ratios, however, the analyst must be careful to distinguish between sources of market power. A firm may have a high Q, for instance, because it has developed some unique product preferred by consumers, or from innovating in production or marketing in an unusually efficient manner. That is why industry Q's are more relevant in discerning market power *per se*: an industry average generally eliminates the unique contributions of any one entrepreneur.

This is even more true when examining the Q ratio for the cellular telephone industry. Because cellular licenses were valuable *ex ante*, before firms had had an opportunity to demonstrate any unique attributes, it is implausible to attribute the capitalized monopoly rents visible in cellular Q ratios to entrepreneurship. The innovative effort involved was winning a license at lottery or purchasing same in the secondary market, an activity which in no way advances consumer interests and which is, thereby, a classic example of rent-seeking.²⁴ Whereas some industry Q ratios are biased above one because of a high level of riskiness, with non-surviving firms falling out of the sample, there are no such survivorship biases in the cellular markets. Licenses to provide this service were highly valuable from the beginning, and firm bankruptcies have not offset the large gains of incumbent license holders.²⁵

In this light, the Q ratios in cellular are astounding. As seen in 1991 data provided by the National Telecommunications and Information Administration, and summarized in Table 4, the ratio between market value and capital replacement cost varies from between 6.68 and 13.52. This vividly reveals that the market believes that prices in excess of cost are being charged now and in the future. In fact, no industry examined in a recent Brookings Institu-

²⁴ See Thomas W. Hazlett and Robert J. Michaels, "The Cost of Rent-seeking: Evidence from Cellular Telephone License Lotteries," *Southern Economic Journal* 59 (January 1993), 425-35.

²⁵ I know of not a single case of a cellular licensee going bankrupt from cellular operations.

tion study of 20 U.S. industries was found to exhibit a Q ratio of over 3.24 during the 1961-85 period, with the next highest Q = 1.9.²⁶ Over the entire period, the all-industry Q ratio was 1.28; between 1981 and 1985, it fell to .85. By comparison, the cellular telephone industry exhibits rents which are "off the chart." The Q ratios are straightforward evidence of noncompetitive pricing in cellular service markets.

TABLE 4			
Q Ratios in Cellular Telephone Markets			
Market Size	Replacement Cost of All Tangible Assets (per pop)	Average Sales Prices (per pop)	Q ratios
Small	\$19.67	\$131.46	6.68
Medium	13.59	168.62	12.41
Large	18.57	250.98	13.52

Source: U.S. Department of Commerce, National Telecommunications and Information Administration, *U.S. Spectrum Policy: Agenda for the Future*, (February 1991) [hereinafter "NTIA"], Appendix D.

Certainly, the Q ratio analysis is well understood on Wall Street. While FCC lotteries were being conducted to issue licenses in 305 MSA (metropolitan service areas) during 1984-86, and for the 428 RSAs in 1988-89, license values were monotonically increasing up through mid-1989, when they appear to have leveled off. On a per pop basis (*per capita* for the franchise area involved), trading prices for MSA licenses averaged \$177 in the spring of

26 These were found in scientific instruments (3.24) and printing (1.9), industries with exit and entry -- *i.e.*, survivorship bias. See: Lawrence F. Katz and Lawrence H. Summers, "Industry Rents: Evidence and Implications," *Brookings Papers on Activity: Microeconomics* (1989), pp. 209-75.

1989, and were \$189 for all of 1991. These prices were paid by investors only due to the opportunity thereby afforded: to charge duopoly prices far above competitive levels. As a 1991 Morgan Stanley report advised investors:

Investing \$170-200 per pop. or more -- a valuation that many analysts suggest is warranted -- in a business that requires hard assets of less than \$20 per pop is justified only if there are enormous returns, and such returns are possible only in an unregulated monopoly or shared-monopoly business.²⁷

Or, as the CBO summarized:

Financial analysts anticipate that cellular telephone companies will earn rates of return on investment in physical capital of 40 percent to almost 100 percent as they exploit the combination of desirable service and the freedom from serious price competition permitted by the duopoly market structure.²⁸

The level of supra-competitive returns (capitalized rents) are huge in the aggregate, as seen in Table 5. By looking at transactions in the market for cellular telephone systems, and estimating capital investment costs, the 1991 NTIA Report deduced the present value of duopoly profits as established by the financial markets, at nearly \$80 billion.²⁹ This indicates a license value, net of physical capital, of \$211 per pop for each of the two duopolists. One way to estimate the present value of an individual subscriber is to use the CBO's current revenue and cost numbers, and to assume that cash flows from current customers stay con-

²⁷ Edward M. Greenberg and Catherine M. Lloyd, *Telecommunications Services, POP Out: The Changing Dynamics of the Cellular Telephone Industry* (New York: Morgan Stanley; April 1991) [hereinafter, "Greenberg & Lloyd"], p. 2.

²⁸ CBO, p. x.

²⁹ This was just in the MSAs, which had a total population of about 189.3 million in 1989. (NTIA 1991, D-2)

stant in nominal terms³⁰ while the discount rate is 10%.³¹ The value of a subscriber is, then, the discounted present value of the perpetuity of a cash flow of \$49.43 per month; i.e., \$49.43 divided by 0.00833 (or 10%/12). This equals \$5,931.84.³² Hence, we have an estimate of the present discounted value of the monopoly pricing margin in today's cellular markets.³³

TABLE 5	
U.S. Data on Cellular Firm Investments and Market Values	
Total MSA Market Value (NTIA 1991 estimate)	\$86,660,800,000
Total MSA Replacement Cost (NTIA 1991 estimate)	\$6,724,900,000
MSA License Values (Net of Capital Cost)	\$79,935,900,000
Book Value, All Systems (1992 CBO report)	\$8,700,000,000

Sources: NTIA 1991, Appendix D; CBO 1992, p. 24.

30 Average monthly cellular telephone revenues are expected to fall over time. Yet, this is primarily a function of new marginal users, with less intense demand for cellular service, coming "on line." Moreover, both operating expenses and capital charges per subscriber are expected to fall over time (Kwerel & Williams, p. 61), tending to stabilize cash flows. Note also that in using a nominal discount rate of 10%, constant revenues are actually declining -- in real terms -- with the rate of inflation.

31 Kwerel & Williams use this discount rate (p. 32).

32 This is abstracting from corporate taxes, which, from the subscriber's point of view, is appropriate. The calculation is made to estimate the present value of the monopoly pricing component which the consumer will pay over time.

33 This also assumes that the per-subscriber capital cost, including marketing, is entirely duplicated every ten years. This is far below current per-subscriber values as seen in purchases of cellular systems. With a penetration rate of 2% per firm and a per-pop value of \$211, the value per-subscriber (after-tax) is \$10,550. This, however, includes expected *subscriber* growth of the system; I have used a more conservative measure of the capitalized value of an individual subscriber today.

4.3 The Cellular Telephone Industry Makes the Case for Market Power.

The evidence that the cellular industry enjoys duopolistic rents is verified by cellular operators themselves. In a series of property tax disputes in California, the industry has argued that state valuations are far too high when they include their FCC licenses. These are characterized as possessing tremendous worth which is wholly divorced from any connection to the real property used in operating a cellular telephone system. They maintain that the value of the FCC cellular telephone license has nothing to do with physical property, but is simply a reflection of the high prices which unregulated duopolists are uniquely allowed to charge customers.³⁴

The cellular industry has argued that it should be relieved of property tax liability because the greatest percentage of their market value is represented by an allegedly nontaxable FCC license. Furthermore, this value derives not so much from spectrum value, but from the duopoly market structure protected by current FCC allocation policy. In essence, the Q ratio analysis conducted above, showing that market value of assets are far above capital costs (not counting the FCC license), is adhered to in its entirety by the industry – with the additional legal twist that the FCC license be thereby taken out of the mix for purposes of establishing property tax liability.

34 This issue took on national importance in the debate over the 1994 federal budget. The 880-page Senate bill included a provision, according to the *Washington Post*, that "licenses for use of the airwaves 'shall not be treated as property of the licensee for property tax purposes, or other similar tax purposes, by any state or local government entity.' Further research found a similar one-sentence provision buried in the 1,624-page House version of the bill..." (Charles R. Babcock, "When a Single Sentence Threatens Loss of Millions: Lobbyist Spots Loophole in Bill's Fine Print," *Washington Post* [27 July, 1993], p. A8.) This measure was discovered by a lobbyist for the State of California, Janet Gregor, and was stricken from the House-Senate reconciliation budget which became law in August 1993.

According to the FCC, each of the two L.A. cellular licenses were worth about \$3.06 billion. This implies a per pop value of \$225, close to Wall Street estimates.³⁵ Yet, both Los Angeles cellular telephone companies have strongly opposed any inclusion of the market value of licenses in their property tax assessments. PacTel Cellular argued to the state's Board of Equalization that:

*The FCC licenses two cellular carriers in each metropolitan area, and these FCC licenses have become very valuable. The marketplace currently assigns a large portion of the value of an operating cellular telephone company to its FCC license. Companies owning FCC licenses have been transferred for substantial sums even when the FCC license was the only valuable asset owned by the company... There are no other California utilities (other than cellular telephone companies) which are subject to Board assessment, own extremely valuable licenses, and are not subject to ratebase regulation.*³⁶

The same letter went on to characterize the sales prices of cellular licenses as containing "speculative value."³⁷ This is another way of saying that the market was anticipating early on that the returns from a noncompetitive industry would be far higher than the costs needed to invest in supplying service. "Speculative value is an investor's estimate of the present value of what the eventual probability of an unproven industry might be, rather than a value which is supported by the current earnings... Investors are paying a premium price for the right to receive future earnings from future investments."³⁸ So the owner of valuable

35 Williams & Kwerel, pp. 55-6.

36 Letter to members of the California Board of Equalization from Gayla Peterson and Eric Miethke, tax attorneys for PacTel Cellular (6 February, 1990), pp. 2-3 (emphasis in original).

37 *Ibid.*, p. 11.

38 *Ibid.* (emphasis in original).

licenses here concedes that market value is established not by the entrepreneurship of actual operators, but by the expectation that the market in general will be exceedingly lucrative in the future.

That that anticipation of profitability is resultant from the federal government's anti-competitive licensing policy is argued clearly and robustly by the non-wireline cellular system, Los Angeles Cellular Telephone Company (LACTC). In April, 1990 their expert witness in their property tax case against the State of California explained the market power associated with a cellular license as follows:

It can be demonstrated that companies in a competitive industry have no particular or material license value. If the market for cellular telephone services was perfectly competitive, it would be open to all sellers willing to make the required investment... Under competitive circumstances, therefore, any license value would be essentially zero.

The market in which the cellular telephone industry operates today is a special form of monopoly or oligopoly called a duopoly. This situation is the result of the FCC limiting to two the number of cellular telephone companies (sellers) in each SMSA... From the licensee's point of view, a license is valuable because it gives the holder some control over its market.³⁹

Whatever the merits or demerits of the legal argument,⁴⁰ it is key to note what the industry quite frankly recognizes: The duopoly market structure results in prices significantly above costs, giving great value to license rights. The industry incumbents also concede that

39 "Declaration of Arthur A. Schoenwald in Opposition to Defendant's Motion for Summary Judgment and Summary Adjudication of Issues," in *Los Angeles Cellular Telephone Company vs. State Board of Equalization, et al.*, No. 509737 Superior Court, Sacramento, California (April 30, 1990) [hereinafter, "Schoenwald declaration"], pp. 24, 25, 27; emphasis in original.

40 The author is an expert witness for the State of California in this and related cases. That FCC license rights are valuable is not, of course, at dispute. The controversial issue concerns whether the market value of those rights should be included in the assessed "going concern" value of property for purposes of state and local property taxation. Several cases are still pending.

the market structure has been imposed by regulators, not by any form of market rivalry, and that the Q ratio analysis reveals pure monopoly rents — not returns to entrepreneurial risk-taking. Moreover, they reveal that it is not the underlying value of spectrum, *per se*, which is important in determining license value. Rather it is the duopoly market power implicitly conferred by the license. This is key to policymaking, in that it reveals that market power can be reduced by the licensing of new entrants.

This view is verified again by the Q ratios. In a review of the appraisals of cellular telephone companies undertaken by the Board of Equalization, the California Auditor General found that market values of cellular systems were, for 22 companies appraised in 1989, about \$3 billion. These same companies appeared to have book values of only about \$485 million. Since these systems were very recently built, these numbers imply a Q ratio of about 6.2. In fact, the license transactions data used by the Board were very conservative: only \$100 per pop was assumed.⁴¹ Moreover, certain nontaxable assets were subtracted out, resulting in net sales values of between \$30 and \$83 per pop. It is remarkable that even this dilution of market value was unable to reduce the industry Q to a competitive level.⁴²

The numbers involved in the LACTC property tax dispute completely verify the Q ratio analysis above. Initially, the California Board of Equalization assessed LACTC only partly via the market value (i.e., sales price) of their system. This produced an assessed value

41 Recall that 1989 prices per pop averaged about \$177 in the MSAs. The lower figure was arrived at by use of the conservative valuation technique employed, which set assessed value as a *weighted average* of three measures: market value, historic book value, and discounted cash flow. Partial use of historic value entirely begs the question of market power, while discounted cash flow methods will understate value when revenue growth in a young industry is above average (as it surely is in cellular). Hence, the non-market methods dramatically lowered the assessed valuation below market value.

42 Auditor General of California, *A Comparison of the State Board of Equalization's Appraisals of the Cellular Telephone Industry's Taxable Property With the Appraisals of Similar Industries Taxable Property* (April 1990); pp. 22-4.